

PROBLEM SOLVING

Lesson 12.8

Name _____

Problem Solving • Classify Plane Shapes

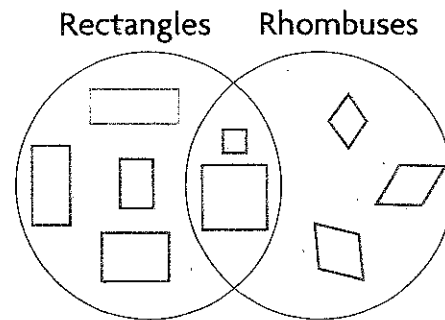
Essential Question How can you use the strategy *draw a diagram* to classify plane shapes?

COMMON CORE STANDARD CC.3.G.1

Reason with shapes and their attributes.

UNLOCK the Problem REAL WORLD

A **Venn diagram** shows how sets of things are related. In the Venn diagram at the right, one circle has shapes that are rectangles. Shapes that are rhombuses are in the other circle. The shapes in the section where the circles overlap are both rectangles and rhombuses.



What type of quadrilateral is in both circles?

Read the Problem

What do I need to find?

What information do I need to use?

the circles labeled _____

and _____

How will I use the information?

Solve the Problem

What is true about all quadrilaterals?

Which quadrilaterals have 2 pairs of opposite sides that are parallel?

Which quadrilaterals have 4 sides of equal length?

Which quadrilaterals have 4 right angles?

The quadrilaterals in the section where the circles overlap have _____ pairs of opposite sides that are parallel, _____ sides of equal length, and _____ right angles.

So, _____ are in both circles.

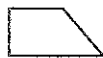
MATHEMATICAL PRACTICES

Math Talk

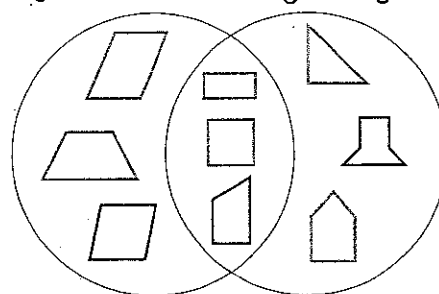
Does a \triangle fit in the Venn diagram? Explain.

Try Another Problem

The Venn diagram shows the shapes Abbie used to make a picture. Where would the shape shown below be placed in the Venn diagram?



Quadrilaterals Polygons with Right Angles



Read the Problem

What do I need to find?

What information do I need to use?

How will I use the information?

Solve the Problem

Record the steps you used to solve the problem.

1. How many shapes do not have right angles?

2. How many red shapes have right angles but are not quadrilaterals? _____
3. What is a different way to sort the shapes?

Math Talk


MATHEMATICAL PRACTICES

What name can be used to describe all the shapes in the Venn diagram? Explain how you know.

Name _____

Share and Show

Use the Venn diagram for 1–3.

1. Jordan is sorting the shapes at the right in a Venn diagram. Where does the  go?

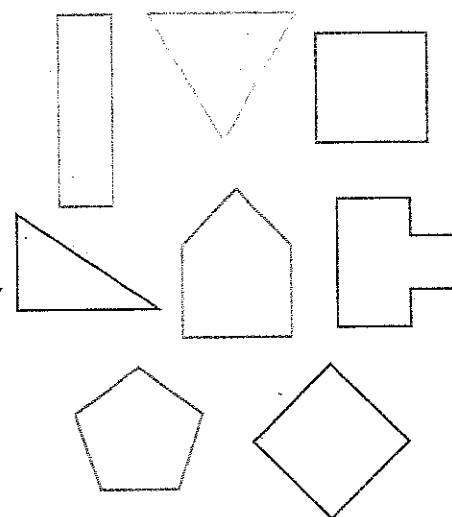
First, look at the sides and angles of the polygons.

Next, draw the polygons in the Venn diagram.

The shape has _____ sides of equal length
and _____ right angles.

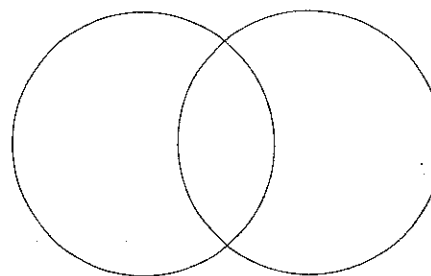
So, the shape goes in the _____

2. **HOT** What if Jordan sorted the shapes by Polygons with Right Angles and Polygons with Angles Less Than a Right Angle? Would the circles still overlap? **Explain.**



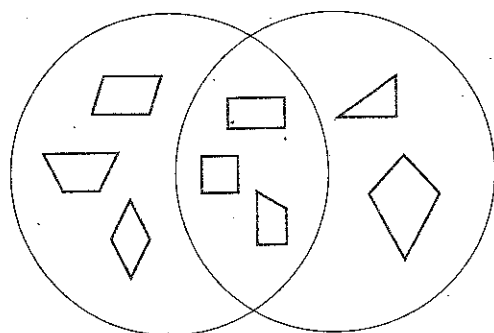
Polygons
with
Right Angles

Polygons with
All Sides Equal
in Length



3. Where would you place a ?

4. **HOT** Eva drew the Venn diagram below. What labels could she have used for the diagram?

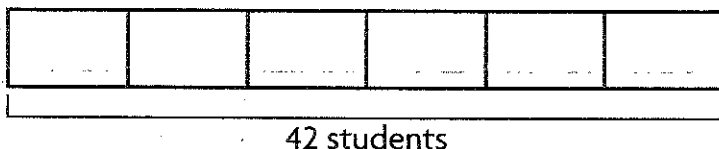


On Your Own.....

Choose a STRATEGY

- Act It Out
- Draw a Diagram
- Find a Pattern
- Make a Table

- Ben and Marta are both reading the same book. Ben has read $\frac{1}{3}$ of the book. Marta has read $\frac{1}{4}$ of the book. Who has read more? _____
- There are 42 students from 6 different classes in the school spelling bee. Each class has the same number of students in the spelling bee. Use the bar model to find how many students are from each class.



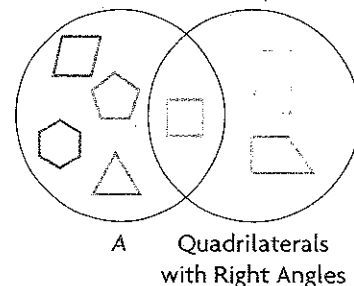
_____ students ÷ _____ classes = _____ students

- H.O.T.** **Write Math** Cara baked 16 cupcakes. She took half of them to school. She gave Frank one fourth of what was left. How many cupcakes does Cara have now? **Explain** how you know.

- Ashley is making a quilt with squares of fabric. There are 9 rows with 8 squares in each row. How many squares of fabric are there?

- Test Prep** What label could describe Circle A?

- (A) Polygons with Perpendicular Sides
- (B) Polygons with 2 Pairs of Opposite Sides That Are Parallel
- (C) Polygons with 2 Pairs of Sides of Equal Length
- (D) Polygons with All Sides of Equal Length



Name _____

Relate Shapes, Fractions, and Area

Essential Question. How can you divide shapes into parts with equal areas and write the area as a unit fraction of the whole?

COMMON CORE STANDARD CC.3.G.2

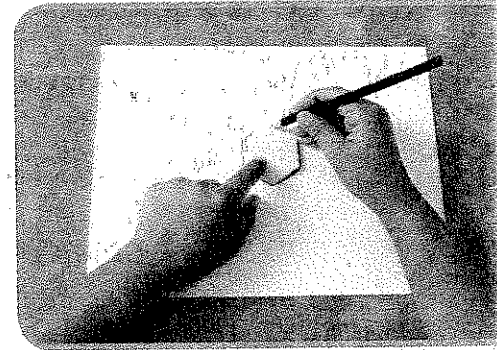
Reason with shapes and their attributes.

Investigate

Materials ■ pattern blocks ■ color pencils ■ ruler

CONNECT You can use what you know about combining and separating plane shapes to explore the relationship between fractions and area.

- A.** Trace a hexagon pattern block.
- B.** Divide your hexagon into two parts with equal area.
- C.** Write the names of the new shapes. _____
- D.** Write the fraction that names each part of the whole you divided. _____
Each part is $\frac{1}{2}$ of the whole shape's area.
- E.** Write the fraction that names the whole area. _____



Math Idea

Equal parts of a whole have equal area.

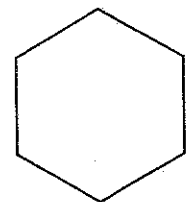
Draw Conclusions

1. Explain how you know the two shapes have the same area.

2. Predict what would happen if you divide the hexagon into three shapes with equal area. What fraction names the area of each part of the divided hexagon? What fraction names the whole area?

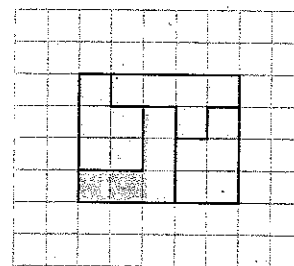
3. **H.O.T.** Apply Show how you can divide the hexagon into four shapes with equal area.

Each part is _____ of the whole shape's area.



Make Connections

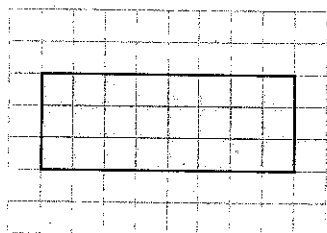
The rectangle at the right is divided into four parts with equal area.



- Write the unit fraction that names each part of the divided whole. _____
- What is the area of each part? _____
- How many $\frac{1}{4}$ parts does it take to make one whole? _____
- Is the shape of each of the $\frac{1}{4}$ parts the same? _____
- Is the area of each of the $\frac{1}{4}$ parts the same? **Explain** how you know.

Divide the shape into equal parts.

Draw lines to divide the rectangle below into six parts with equal area.



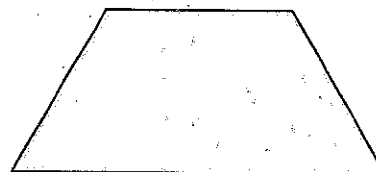
Math Talk MATHEMATICAL PRACTICES Explain how you know the areas of all the parts are equal.

- Write the fraction that names each part of the divided whole. _____
- Write the area of each part. _____
- Each part is _____ of the whole shape's area.

Share and Show



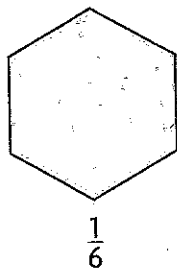
1. Divide the trapezoid into 3 parts with equal area. Write the names of the new shapes. Then write the fraction that names the area of each part of the whole.



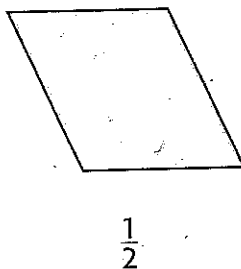
Name _____

Draw lines to divide the shape into equal parts that show the fraction given.

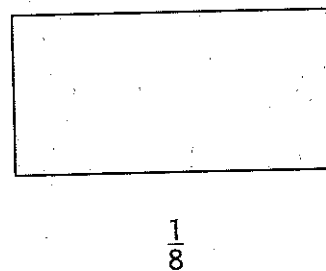
2.



3.

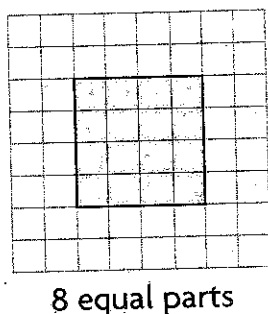


✓ 4.

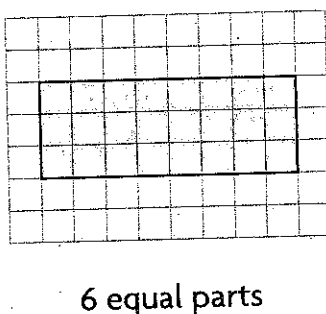


Draw lines to divide the shape into parts with equal area. Write the area of each part as a unit fraction.

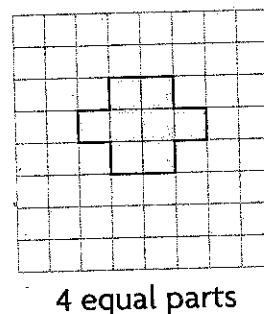
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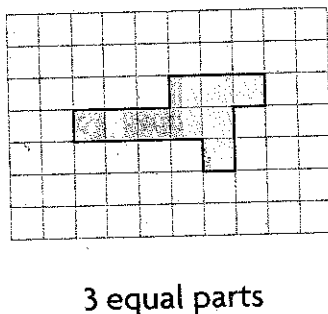
✓ 6.



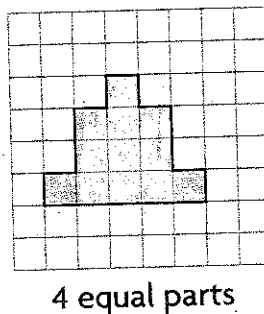
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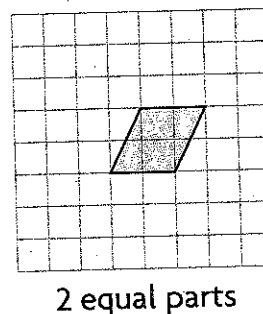
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


9.



10.



11. **Hot Write Math** If the area of three  is equal to the area of one , the area of how many  equals four ? Explain your answer.